

## REMARKS

### Status of the Claims

Claims 7-22 are pending.

Claims 7-19 are currently withdrawn from consideration.

### Issues Under 35 U.S.C. § 103

I. Claim 20 is rejected under 35 U.S.C. § 103(a) as being allegedly unpatentable over U.S. 5,811,834 (“Tamano”) in view of WO 03/046108 (“Doi”), where U.S. 2005/0106413 (“Tanaka”) is used as the English equivalent, and U.S. 5,389,444 (“Hosokawa”). This rejection is respectfully traversed. Reconsideration and withdrawal thereof are requested.

The primary reference, Tamano, is well discussed in the record. While it generally discloses a light emitting device composed of an anode, a cathode, a hole injection layer, and a light emitting layer, there are significant deficiencies in Tamano when compared to the present invention.

For example, the Office Action even acknowledges that Tamano fails to suggest an alcohol-insoluble electronically conductive polymer. See page 5 of the Office Action. Also, the Examiner has not shown where in Tamano the light emitting layer acts as the electron transporting layer. See Office Action at page 5. The section of Tamano cited by the Examiner only recites layer configurations having a light-emitting layer as well as electron-transporting and/or hole-transporting layers. See Tamano at col. 23, lines 39-55. Even assuming the light-emitting layer functioned as an electron-transporting layer, this interpretation seems

counterintuitive since, certain devices in Tamano comprise both a light-emitting and an electron-injecting layer.

Additionally, Tamano only discloses that any method, including wet methods, may be used to make any of the layers within a device. See Tamano at col. 24, line 64 to col. 25, line 10. Tamano also discloses that when using a wet method without certain additives, the layers are susceptible to pinholes. See Tamano at col. 25, lines 16-19. This broad recitation that any layer may be made by any method does not disclose or suggest a device wherein the electron transporting layer is made on the hole transporting layer by the wet method using alcohol. See claim 20. As discussed on the record, this nonobvious feature is what, *inter alia*, allows the present invention to achieve superior and unexpected results.

The Office Action attempts to remedy these deficiencies by asserting that one of ordinary skill in the art would be motivated to combine Tamano with the secondary reference, Doi et al. (Tanaka), and further combine the two with a third reference, Hosokawa.

However, the asserted combination fails to rise to the level of creating a *prima facie* case of obviousness. Additionally, even when combined, the asserted references fail to disclose each and every element of the claimed invention.

For example, Tanaka (i.e., Doi) also fails to disclose or suggest the nonobvious feature of the electron transporting layer is made on the hole transporting layer by the wet method using alcohol. See claim 20. Furthermore, Tanaka (i.e., Doi) also fails to disclose or suggest the claimed phosphorus-containing compounds of the present invention.

The tertiary reference, Hosokawa, appears to be relied upon solely in connection with the notion that “the spin coating method is preferred over other methods... because it leads to uniforms with fewer pinholes compared to the other methods (column 35, lines 6-31).” See page 6 of the Office Action. Thus, this reference also fails to remedy the deficiencies of Tamano and Doi.

In addition, one of ordinary skill in the art would be motivated to combine bits and pieces of Hosokawa with bits and pieces of the first two references because Hosokawa does not even disclose or suggest anything about the characteristics of the present invention, that is, “difference in solubility to alcohol between organic compound materials forming an organic electroluminescent element” and does not disclose the specific phosphorus-containing organic compounds represented by the general formulae (1) to (3) of the present invention as the material of the electron-transporting layer.

Furthermore, the characteristic discussed in Hosokawa that was cited by the Examiner of “spin coating... being capable of facilitating production of uniform films and prevent pinholes” is a common characteristic of the spin coating process, which falls under the wet method, and therefore cannot be a motivation for the characteristic of the present invention that takes into account at least the solubility to alcohol of the organic compound materials.

One of skill in the art would also find that Hosokawa, when viewed as a whole, in combination with Tamano in view of Doi actually teaches away from the present invention. See MPEP § 2141(02(VI)). In the Office Action, the Examiner simply picked and chose statements in Hosokawa without considering the Hosokawa reference in its entirety. While Hosokawa generally discloses that spin coating may be used to form layers, the devices described in

Hosokawa are actually formed by depositing a first layer via a wet method and then forming a second layer on the first layer using vapor deposition. See e.g., Hosokawa at Examples 1, 2, and 9. The features of the present invention are not disclosed as “alternatives” in Hosokawa. See MPEP § 2141.02(VI).

Therefore, the Hosokawa reference does not have motivation for the present invention and any combination between Tamano, Doi, and Hosokawa does not allow a person skilled in the art to arrive at the present invention..

For rejections made “under 35 U.S.C. § 103, the examiner should set forth in the Office action... (c) the proposed modification of the applied reference(s) necessary to arrive at the claimed subject matter....” See MPEP § 706.02(j). “[E]ither the references must expressly or impliedly suggest the claimed invention or the examiner must present a convincing line of reasoning as to why the artisan would have found the claimed invention to have been obvious in light of the teachings of the references.” *Id.* The Examiner has failed to meet this burden because the cited references do not suggest the claimed invention, expressly or impliedly, the Examiner has not provided a convincing line of reasoning regarding the same, and the combination of references teaches away from the claimed invention. The portions of the references cited by the Examiner contain statements regarding dry and wet methods as well as various materials, but they do not teach the above-discussed features of the claimed invention.

Thus, the Examiner has not established a *prima facie* case of obviousness.

The proposed combination of references is also improper because no adequate reason or motivation for the proposed combination has been offered. “Under the correct analysis, any need or problem known in the field of endeavor at the time of the invention and addressed by the patent [or application under examination] can provide a reason for combining the elements in the manner claimed.” See MPEP § 2141.01(a). Under the *KSR* “functional approach”, rationales that may support a conclusion of obviousness are generally based on combinations, substitutions, or applications that either result in the same or predictable results. See MPEP § 2143.

In the present case, the Examiner asserts that one would have been motivated to combine Hosokawa with Tamano and Tanaka, because “[t]he motivation to make the layers using a spin coating method would be to lead to a layer with fewer pinholes that [sic] when using different techniques.” See Office Action at page 7. As discussed above, the advantages of spin coating were known, but spin coating alone does not amount to a reduction of pinholes achievable by the nonobvious features recited in claim 20. The motivation to combine references based on spin coating is insufficient because it does not consider the claimed invention as a whole. No arguments have been offered to justify the proposed combination using, for example, a “function approach”. Thus, the proposed combination of references itself is wrongful, and can not be used to allege that the claimed invention is obvious.

It is also impermissible for an Examiner to combine references using hindsight and “knowledge gleaned only from applicant’s disclosure....” See MPEP § 2145(X)(A). Instead, references should be combined taking “into account only knowledge which was within the level of ordinary skill in the art at the time the claimed invention was made.” *Id.* It appears that impermissible hindsight was used to combine the cited references. None of the references

contain or allude to a motivation for combining the references with a view towards the claimed invention. The Examiner has failed to show how, excluding the teachings of Applicant's disclosure and hindsight, the features of the claimed invention were within the level of ordinary skill in the art at the time the claimed invention was made. Therefore, assuming the proposed combination even renders the claimed invention obvious, it appears that the Examiner used impermissible hindsight to piecemeal various statements from the cited references to form this rejection.

For these further reasons, a *prima facie* case of obviousness has not been established.

With regard to the Declaration that was submitted with the previous Response, the Examiner alleges that Hosokawa shows that the unexpected results of the claimed invention were well known and predictable. See Office Action at page 4. This view is flawed and not one that would be shared by one of ordinary skill in the art. As discussed above, the Examiner has focused solely on the wet method, which was known to reduce pinholes. On the other hand, the Declaration concerns itself with the invention as a whole and its tendency to reduce pinholes, a feature that is derived not solely from using a wet method, but from at least taking into account the varying solubility of the various layers of an electroluminescent device in alcohol. It should be clear that Hosokawa is not an appropriate link to remedy the deficiencies of the first two cited references.

Thus, one of ordinary skill in the art would recognize that the present invention, as discussed in the previously submitted Declaration, does exhibit superior and unexpected results.

Accordingly, Applicants respectfully submit that this rejection should be withdrawn.

**II.** Claim 20 is also rejected under 35 U.S.C. § 103(a) as being allegedly unpatentable over JP2004-095221 (“Murase”) in view of Hosokawa, and, optionally, in view of WO 2005/073340 (“Spaochak”). This rejection is respectfully traversed. Reconsideration and withdrawal thereof are requested.

The Examiner’s allegations with regard to Murase and Spaochak have been well discussed in the record. The Examiner acknowledges that Murase does not specifically teach an electroluminescent device comprising the applicant’s claimed invention. See Office Action at pages 8 and 9. Murase also does not disclose an electron transporting layer made by the wet method using alcohol on a hole transporting layer, as recited by claim 20.

The Office Action attempts to remedy these deficiencies by asserting that one of ordinary skill in the art would be motivated to combine bits and pieces of Murase with Spaochak and/or Hosokawa. However, the asserted combination fails to rise to the level of creating a *prima facie* case of obviousness. Additionally, even when combined, the asserted references fail to disclose each and every element of the claimed invention.

Hosokawa is cited only for allegedly disclosing that spin coating is preferred over other methods. See Office Action at para. 29. Hosokawa does not remedy the deficiencies of the other references and does not disclose or suggest the claimed invention. As discussed above, Hosokawa, when viewed as a whole, actually teaches devices that are made in an opposite manner and therefore teach away from the claimed invention. Thus, one of ordinary skill in the

art would not view Hosokawa as being an appropriate link to remedy the deficiencies of the other cited references.

Spaochak was only cited for allegedly disclosing electroluminescent devices that are comprised of compounds containing diphosphines that are electron transporting. See Office Action at para. 28. Thus, Spaochak also fails to cure the deficiencies of Murase because, for example, it does not disclose or suggest at least an electron transporting layer made by the wet method using alcohol on a hole transporting layer.

Because Murase, Hosokawa, and Spaochak fail to disclose at least the feature of the claimed invention of an electron transporting layer made by the wet method using alcohol on a hole transporting layer, as recited by claim 20, the Examiner has failed to meet their burden in establishing a *prima facie* case of obviousness. See MPEP § 706.02(j).

Thus, the Examiner has not established a *prima facie* case of obviousness.

Additionally, the proposed combination is improper because no adequate reason or motivation for the proposed combination has been offered. The Examiner alleges and that one would be motivated to combine bits and pieces of Hosokawa with bits and pieces of Murase or Murase and Spaochak “to make an electroluminescent device with excellent thermal stability, high luminous efficiency, low drive voltage, and excellent color purity” with “a layer with fewer pinholes than other well known methods.” See Office Action at pages 7, 8, and 10. As discussed above, the advantages of spin coating alone were not the motivation behind the reduction of pinholes achievable by the nonobvious features recited in claim 20. No arguments have been



offered to justify the proposed combination using, for example, a “functional approach”. See MPEP § 2143.

It also appears that impermissible hindsight was also used to combine the cited references, as none of the references disclose or suggest combining the references with a view towards the claimed invention. See MPEP § 2145. Instead, it appears that the Examiner used impermissible hindsight to piecemeal and combine various elements from the cited references to form this rejection.

For these further reasons, a *prima facie* case of obviousness has not been established.

Lastly, also as discussed above, the present invention exhibits superior and unexpected results. These results are evidenced by at least the Declaration that was submitted along with the previous Response. These results are not, as the Examiner alleges, negated by the disclosure of Hosokawa.

Accordingly, Applicants respectfully submit that this rejection should be withdrawn.

**III.** Claims 20-22 are rejected under 35 U.S.C. § 103(a) as being allegedly unpatentable over JP2003-317965 (“Matsuura”), where a machine translation is used as an English equivalent, in view of Hosokawa. This rejection is respectfully traversed. Reconsideration and withdrawal thereof are requested.

Matsuura has been well discussed in the record. However, there are deficiencies in the Matsuura reference when compared to the present invention. For instance, Matsuura fails to

suggest at least the feature of the claimed invention of an electron transporting layer made by the wet method using alcohol on a hole transporting layer, as recited by claims 20-22. The Examiner also acknowledges at least that Matsuura does not specifically suggest a compound that reads on Applicant's formulas (2) and (3), but alleges that it would have been obvious for one of ordinary skill in the art to have combined formulas (2) and (5) of Matsuura to arrive at the claimed compounds because "formula (2) and formula (5) only differ in that one contains an oxide...." See Office Action at page 11 and 13. However, this is not the correct standard for showing obviousness. Obviousness can not be shown by only citing a reference that discloses two or more compounds having features that, when combined, may arrive at the claimed compounds.

Instead, the Examiner is required to use one of the obviousness rationales to show why the combination would have in fact been obvious and why one of ordinary skill in the art would have attempted the combination. For example, the Examiner may select a "lead compound" and provide a motivation for why one of skill in the art would select the particular lead compound and modify it in a particular manner to arrive at the claimed compound. See e.g., *Federal Register*, "Examination Guidelines Update: Developments in the Obviousness Inquiry After *KSR v. Teleflex*", A Notice by the Patent and Trademark Office, September 1, 2010. Thus, merely alleging that it would have been obvious to pick the oxides of one compound and incorporate them into the structure of another compound fails to render the claimed compounds obvious.

The Office Action attempts to remedy these deficiencies by asserting that one of ordinary skill in the art would be motivated to combine Matsuura with the secondary reference, Hosokawa, to arrive at the claimed invention. However, the asserted combination fails to rise to

the level of creating a *prima facie* case of obviousness. Additionally, even when combined, the asserted references fail to disclose each and every element of the claimed invention.

The secondary reference, Hosokawa, does not cure these deficiencies since it was only cited for discussing that spin coating is preferred over other methods. See Office Action at page 11. As discussed above, Hosokawa, when viewed as a whole, actually teaches devices that are made in an opposite manner and therefore teach away from the claimed invention. Thus, one of ordinary skill in the art would not view Hosokawa as being an appropriate link to remedy the deficiencies of the other cited references because Hosokawa does not suggest at least forming an electron-transporting layer on a hole-injecting layer by the wet method or Applicant's formulas (1)-(3). See claims 20-22.

Because Matsuura and Hosokawa fail to disclose at least the feature of the claimed invention of an electron transporting layer made by the wet method using alcohol on a hole transporting layer, as recited by claims 20-22, the Examiner has failed to meet their burden in establishing a *prima facie* case of obviousness. See MPEP § 706.02(j).

Thus, the Examiner has not established a *prima facie* case of obviousness.

Additionally, the proposed combination is improper because no adequate reason or motivation for the proposed combination has been offered. The Examiner alleges that one would have been motivated to combine Hosokawa with Matsuura, "to improve luminescence luminosity and lifetime of a device" with "a layer with fewer pinholes than other well known methods." See Office Action at page 13. As discussed above, the advantages of spin coating alone were not the motivation behind the reduction of pinholes achievable by the nonobvious

features recited in claims 20-22. No arguments have been offered to justify the proposed combination using, for example, a “functional approach”. See MPEP § 2143.

It also appears that impermissible hindsight was also used to combine the cited references, as none of the references disclose or suggest combining the references with a view towards the claimed invention. See MPEP § 2145. Instead, it appears that the Examiner used impermissible hindsight to piecemeal and combine various elements from the cited references to form this rejection.

For these further reasons, a *prima facie* case of obviousness has not been established.

Lastly, also as discussed above, the present invention exhibits superior and unexpected results. These results are evidenced by at least the Declaration that was submitted along with the previous Response. These results are not, as the Examiner alleges, negated by the disclosure of Hosokawa.

Accordingly, Applicants respectfully submit that this rejection should be withdrawn.

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In sum, because at least the “electron-layer formed on the hole-transporting layer by a wet method using alcohol” feature recited by claims 20-22 is not taught or suggested by Tamano, Tanaka, Murase, Spaochak, Matsuura, Hosokawa, or combinations thereof, the claimed invention is not obvious. A wet method for forming an electron transporting layer does not amount to the nonobvious features of the claimed invention. The claimed invention is further

believed to be patentable in light of its superior and unexpected results compared to the devices of the cited references, which have been discussed on the record.

Additionally, as shown above, the basis for the Examiner failing to give sufficient weight to the Declaration under 37 C.F.R. § 1.132 (by citing Hosokawa) is shown to be improper, and would not be a position shared by one of ordinary skill in the art.

Therefore, from the foregoing this application is believed to be in condition for allowance.

If the Examiner has any questions concerning this election or the Application in general, he is respectfully requested to contact the undersigned at the number listed below.

Respectfully submitted,

A handwritten signature in black ink, appearing to read "R. Myers, Jr.", with a stylized flourish at the end.

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